dorsal organs (such as the nervous system) than the ventral; and the tissues adjacent to the middle line than the outer tissues. The flow of matter and energy along these axes is apparently faster in certain directions, or the developmental impulses are transmitted more rapidly in these directions, than in others.

In order to test this view, the author has performed a number of experiments. He has placed the developing eggs of certain fish in water to which were added substances, such as alcohol and cyanides, that lessened the rate of natural development, and he placed others under adverse conditions, such as intense cold or diminished oxygen pressure. The results of these experiments, made by Prof. Newman, show that those embryos which survived exhibited most retardation in those regions where normal specimens normally reared undergo their most rapid development. On continuing these experiments, however, he found that a certain number of the experimental animals recovered from this inhibitory effect, and that this recovery is most marked in the very regions which had previously been most depressed. For example, the development of the head was at first retarded, but if the fish survived this first period of life under experimental conditions, then the development of its head was accelerated, and, indeed, to such a degree as to render it incapable of continued existence. These non-viable embryos exhibited the strangest appearance. Some "consisted of nothing but isolated eyes"; others "merely of heads with large rolling eyes and a tiny indifferentiated appendage that stands for the rest of the body"; others, again, "became broad and flat, like a skate, or high and compressed, like a sunfish. In fact, a good assortment of experimental monsters will furnish parallels to most of the stock types of form-distortion seen in the specialised and degenerate groups of fishes" (p. 161). We can only regret that the author has not reproduced figures and descriptions of these interesting monsters, or given references to the literature.

These results lead the author to seek for a cause which has acted upon growth and development during the course of animal history somewhat in the way that the depressing agency of his experiments has led to modification of form. The problem is to explain the elongated newt and the truncated frog; in other words, the tendency of animal groups to cephalisation, to abbreviation of the abdominal and caudal regions in the more highly organised members of most classes. Here he has nothing to offer us. He speaks, as so many American writers on biology do, of "the ageing of the hereditary chromatin" as an internal factor that has operated in preserving, for example, the neoteric or perennially youthful type of body, or in other ways. He attempts to correlate the elongated form of body with the effect of low temperatures acting as a depressing agent. We are put off with phrases such as "lowered rates of chemical metabolism" and "racial senescence," expressions which really have no scientific content. The moral of all this is that we do not know enough evolutionary physiology to enforce conclusions drawn from our anatomical and developmental records of animal structure by conclusions based on corresponding records of their past and present living processes. The anatomical evidence alone leads to such melancholy exhibitions of inconclusive reasoning as are found in the discussions on animal phylogeny in this book; and if the author has not been successful in applying physiological tests to animal pedigrees, we can but applaud his courage in making the attempt. F. W. G.

Ancient Metal Implements.

Tools and Weapons: Illustrated by the Egyptian Collection in University College, London, and 2000 Outlines from Other Sources. By Prof. W. M. Flinders Petrie. (British School of Archæology in Egypt and Egyptian Research Account, Twenty-second Year, 1916.) Pp. vii+71+lxxix plates. (London: British School of Archæology in Egypt; Constable and Co., Ltd.; Bernard Quaritch, 1917.) 35*s.* net.

ONE of the ever-present problems of archæology is the degree of interdependence in which the ancient civilisations stood to one another in the matter of customs, religion, and the material objects of everyday life. Where undoubted importations occur the question becomes simple, but in the early ages of man's civilisation these imports are more often lacking, and the sole evidence available comes from a typological comparison of various classes of objects. In the volume under review Prof. Flinders Petrie has devoted himself to a study of Egyptian implements other than most of the stone types, and by the aid of numerous figures of similar implements from other countries, chiefly in Europe and Western Asia, he has sought to demonstrate the part played by Egypt in the invention and development of the various tools and weapons known to the ancient world.

If one fact emerges more clearly than another from this study, it is the extraordinarily small

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measure in which Egypt exerted influence on, or was influenced by, other lands. In the subject of investigation, as in many other respects, Egypt stands apart. At the outset of her metal age it is only natural that she should have borrowed from Cyprus some of the copper forms current there; but, apart from the scalloped axe borrowed from Syria about the Fifth Dynasty, there is no other important instance of the borrowing and subsequent development of any form throughout her history. Other weapons, pins and the like, of European and Western Asiatic forms, are for the most part importations due to commerce or invasions. The non-adaptation of many of the most useful European developments of the middle and late Bronze age, particularly the socket, makes it difficult to accept a Sicilian origin for the recurved knife (K.135). Why is it bronze in Sicily and iron in Egypt, when neither Sicily nor Egypt was using iron, and why is this peculiar form found and not the equally peculiar Sicilian notched razor (X.44)? It is regrettable that no mention is made of the smith's hoard from Cyprus (Dussaud, *op. cit.*, Fig. 180), which contains many parallels to Egyptian types. The idea (p. 30) that the sword or dagger with winged flanks at the top of the blade is a scattered type is probably quite erroneous. D.163, cited as one example, is indubitably a halberd of a form peculiar to Western Europe, and thus the wings served a purpose entirely different from that of the wings of D.161 and D.162. D.162 is certainly Minoan in origin, so that this type is in reality confined to the Ægean and Greece of Minoan times.

Though restricting himself to such classes of implements as actually occur in Egypt, Prof. Petrie has much that is suggestive to say about many European forms. Particularly interesting are his remarks on the pretended Ægean copper ingots of double-axe form, and the very numerous figures of European implements over and above the Egyptian examples provide a valuable *corpus* for archæological study. The work throughout brims over with instances of Prof. Petrie's ingenuity in offering practical explanations of details of form and technique. The paragraphs and plates dealing with bronze-casting and stone-cutting are a useful adjunct to what he has already written on these subjects in his "Arts and Crafts of Ancient Egypt," though even to Prof. Petrie the material used in the latter art as applied to the harder rocks remains a mystery.

A few misprints have been noticed. On p. 20, §48C, C.25 should be C.26; on p. 46, l. 34, "durite" is of course diorite; and the references for K.130 and 137 are M.A. XXI. VI., not V.

Our Bookshelf.

Report of the Ninth Annual Conference of Educational Associations held at the University College, London, 1921. Pp. viii + 470. (London: Conference Committee, 9 Brunswick Square, London, W.C.1, 1921.) 5*s*.

It is stated in the preface to this highly important report that the ninth annual Conference of Educational Associations was even more successful than any of its predecessors. The report includes the proceedings of thirty-seven out of the forty-six various educational associations which are affiliated to the National Conference, which extended from December 29 to January 8. The conference was presided over by Viscount Burnham, whose Committee, under his guidance, has done such admirable work in relation to the financial position of the teachers in elementary and secondary schools. The various associations meet together under the auspices of the Teachers' Guild of Great Britain and Ireland, and some of them take the occasion to hold their annual meetings, and afterwards throw their meetings open to any members attending the conference.

The proceedings of the conference began at Bedford College with an inaugural address by Prof. J. Adams, of the University of London, on "Instinct and Education." Two joint conferences were held. The first discussed "The Use of Psycho-analysis in Education," and was so largely attended that an extra joint conference was afterwards held at which the subject was further considered; while the second dealt with the important question of "How Best Can a Feeling of Professional Solidarity be Created and Maintained among Teachers?" at which Viscount Burnham presided. This was held on the last day of the conference, and was but meagrely attended. It was, unfortunately, held in the absence of any official representatives of the large body of primary teachers.

The conference was attended by 2200 members of the affiliated societies, as well as by nearly 1000 visitors. Arrangements are in course of preparation for the next conference to begin on December 28 or 29 next, when it is expected that further associations will have joined the conference.

In Farthest Burma. By Capt. F. Kingdon Ward. Pp. 311. (London: Seeley, Service, and Co., Ltd., 1921.) 25*s*. net.

Capt. Kingdon Ward left Myitkyina, the railhead in Upper Burma, in April, 1914, on a journey to the little-known frontier lands around the head streams of the Irrawaddi, with the object of continuing the botanical researches which had previously taken him to Yunnan and the Burmese frontier. His course was by the Nmaihka valley, with a deviation *via* the Ngawchanghka valley and an ascent of Imaw Bum, to the frontier post at Kawnglu. Thence he passed by Langtao to Fort

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